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Remarks

The Examiner has rejected all claims presently pending as anticipated under 35 USC 102 by Beavin et al. As the basis for this rejection, the Examiner submits that Beavin et al. disclose forming a histogram of an attribute of a relation, "the histogram being augmented to identify the most frequent values of an attribute (col. 7, lines 20-67 and Fig. 6A-6B)". Applicant respectfully disagrees.

The Beavin et al. patent discloses forming several types of statistics for a table, but not combined statistics, as are presently claimed. As summarized in Fig. 6A of Beavin et al., the statistics collected in that patent include cardinality statistics (620-622), multi-column frequent values (630-632), multi-column linear quantile (histogram) (640-642) and multi-column polygonal quantile (histogram) (650-652). The Examiner has taken the view that the concepts claimed in the present application are anticipated by this disclosure of accumulating both frequent values and histogram or "quantile" statistics. However, this is not an accurate reading of the claims being presented. Specifically, the claims being presented recite a histogram that is "augmented to identify the most frequent values of [an] attribute". Thus, the histogram not only identifies "bins" and statistics for them, but also identifies frequent values.

Beavin et al. does not describe a histogram that is "augmented to identify" frequent values. Rather, the Beavin et al. histogram is independent from and used independently from frequent values, and vice versa. This is made perfectly clear by Fig. 6B of Beavin et al. (cited by the Examiner), which shows that if a query has "equal"

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predicates (step 661), then cardinality statistics or frequent values are used in step 662, but if not, in steps 646, 647 656 and 657 one of the form of histogram is used. In no case are both the frequent values and histogram used. Furthermore, there is no suggestion that any connection is made or exists between the frequent values and the histogram, other than that both are stored in the Beavin et al. system.

As the present application makes plain, augmenting a histogram to identify frequent values is particularly useful in generation of statistics, because frequent values and histogram statistics can be combined in unique and novel ways to create more accurate estimates on complex queries such as JOIN queries, than could be achieved with frequent values or histograms alone. These combined uses are illustrated in Figs. 3A and 3B, and the associated text of the application. These clear advantages over the prior art render the creation of such an augmented histogram clearly patentable over the use of a histogram, per se, or frequent values, per se.

While the claims as previously presented already clearly recited a histogram that is "augmented to identify" frequent values, this recitation has been clarified by amendments made herein, which recite the inherent definition of a histogram as "statistics regarding tuples falling within each of a plurality of ranges", and recite augmenting frequent values that are "within at least one of said ranges". With these clarifications the distinctions of the present claims from Beavin et al. are all the more evident, as in no sense does Beavin et al. associate or connect frequent values to

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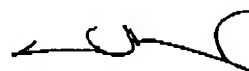
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value ranges of a histogram, such as is done in the data structures of Figs. 2A and 2B of the present application.

All claims recite the clearly distinguishing feature of a histogram "augmented to identify" frequent values, which is neither shown or suggested by Beavin et al. As this distinction lends patentable advantages to the presently claimed invention, Applicant submits that all claims are clearly patentable over Beavin et al., and requests early transmission of a Notice of Allowability.

If any petition for extension of time is necessary to accompany this communication, please consider this paper a petition for such an extension of time, and apply the appropriate extension of time fee to Deposit Account 23-3000. If any other charges or credits are necessary to complete this communication, please apply them to Deposit Account 23-3000.

Respectfully submitted,



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